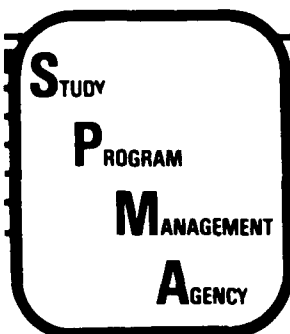


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ARMY STUDY HIGHLIGHTS

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VOLUME IX

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November 7, 1988

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> The purpose of the Army Study Highlights, Volume IX, is to acknowledge outstanding contributions of individual analysts and encourage continuing excellence in the Army analysis community. This year the panel selected nine quite varied study efforts which provide a very interesting mix.

The studies selected represent examples of efforts that were professionally conducted and are of significance to the Army's goals and missions. Selections were based on an assessment of the principal findings, main assumptions, principal limitations, scope, objectives and approach of each study. Our belief is that the analysis community can benefit from examples of quality analysis. Since there is something to be learned by all of us I urge you to make the widest possible distribution of the Army Study Highlights.

This year, in addition to the study gists, we are publishing a set of lessons learned from peer reviews of studies conducted by various Army analytical agencies.

Your suggestions are welcome. Requests for additional copies of this publication should be directed to Ms. Gloria Brown, of my office, AV 227-0026/(C) 202/697-0026.

EUGENE P. VISCO, Director
Study Program Management Agency
Office of the Deputy Under Secretary
of the Army (Operations Research)



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Keywords: Army training, Army research, Military doctrine, Logistics management, Management Information Systems, Recruiting. (SIXO)



TRAC-WSMR-TEA-33-87

DEVELOPMENT OF M1A1 TANK SECTION AND PLATOON
EUROPEAN TRAINING SCENARIOS

STUDY
GIST

THE REASON FOR CONDUCTING THE STUDY was to assist the commander of the Seventh Army Training Command in developing realistic threat-oriented training scenarios for M1A1 tank sections and platoons that can be applied on Range 118 in Grafenwoehr, Federal Republic of Germany.

THE PRINCIPAL RESULTS of this study were (1) a detailed description of the threats an M1A1 tank could expect to encounter when in the defense and when on the offense in a European environment; (2) how these threats are arrayed against a tank section in the defense, a tank platoon in the defense, a tank section on the offense, and a tank platoon on the offense; (3) an automated method for presenting these threat arrays on a firing range; and (4) a scoring system for measuring performance against the threat arrays.

THE MAJOR RESTRICTIONS of the study were as follows: only two operational scenarios were selected to generate the threat for this study; only M1A1 main gun action was analyzed; only those threat arrays that could be realistically presented on a range were considered; and target arrays and performance standards were developed for M1A1 sections and M1A1 platoons only.

THE SCOPE OF THE STUDY included using only operational scenarios set in a European environment, that portrayed BLUE forces in a defensive and offensive posture, and that incorporated only current day (1988) BLUE and RED forces. The study considered only the performance of a section/platoon as a whole against targets that can be realistically presented on a live-fire range.

THE STUDY OBJECTIVES were as follows: (1) to develop a set of realistic, European-based threat scenarios for training M1A1 tank sections in defense, M1A1 tank sections on offense, M1A1 tank platoons in defense and M1A1 tank platoons on offense on a live-fire range; and (2) to develop section and platoon performance standards required to defeat these threats.

THE BASIC APPROACH for this study was training-modeling integration (T-MI). The approach consisted of developing training requirements for a specific weapon system based on the threat portrayed in accepted operational scenarios which are simulated in a force-on-force computer combat model. A European defense and a European offense scenario were each executed for 40 replications in the CARMONETTE/T combat model. The history of events from each scenario was analyzed to identify threat characteristics (target type, range, aspect angle, and speed) and distributions of the RED units arrayed against the M1A1 in the scenarios. These exchanges of fire between the M1A1 and the RED units were aggregated into a distribution of unique target arrays (engagements) against an M1A1 section and platoon for each scenario. The M1A1 section/platoon probability of survival distribution was developed for each of these target arrays. These probability of survival distributions were subsequently incorporated into a scoring system for measuring M1A1 section/platoon performance on a live-fire range in the threat scenarios.

THE STUDY SPONSOR was the U.S. Army Seventh Army Training Command, AETTG-OPN, Grafenwoehr Training Area, APO NY 09114. The sponsor retained proponency for this study.

THE STUDY AGENCY WAS THE U.S. Army TRADOC Analysis Command-White Sands Missile Range, Unit Training Effectiveness Analysis Directorate, ATRC-WHC, White Sands Missile Range, New Mexico 88002-5502. Point of Contact is Richard R. Laferriere, AUTOVON 258-4356/3390.

THE STUDY IMPACT. If M1A1 tank sections and platoons are not presented a realistic threat in the training environment, they may not be successful in defeating that threat in combat. Furthermore, until the relationship between training development and combat development, and thus battlefield effectiveness is developed, resources allocated to training remain largely unjustified.

DTIC ACCESSION NUMBER: B118622

START AND COMPLETION DATES OF STUDY: Nov 86 - Nov 87

DIRECT SUPPORT SYSTEM/AIR LINE OF COMMUNICATION
(DSS/ALOC) STUDY

STUDY

GIST

THE PRINCIPAL FINDINGS:

The study consists of findings, analysis, and recommendations. The report explains the nature of the DSS/ALOC system, those aspects of the system germane to Korea, and 14 findings of the study team. Each finding is presented as a problem statement, followed by an analysis of the problem, recommendations for improvement, and a cost-benefit analysis. The cost of doing the study (manpower and TDY) was approximately \$70,000. Hard dollar savings offset this amount. Cost avoidance savings from reduced OST will be about \$5 million annually.

THE MAIN ASSUMPTIONS:

- (1) The DSS/ALOC system was operating adequately, but inefficiencies were causing excessive order ship time.
- (2) Supply and transportation coordination could be improved.
- (3) US Army and US Forces Korea regulations specify the OST for Korea as 59 days by surface, and 27 days (28 days is DA standard) by air. Order ship time could be improved within Korea by attention to the four in country segments of OST.

THE PRINCIPAL LIMITATIONS.

- (1) The number of personnel available to conduct the study was limited to two analysts. Because of this limitation, the study team solicited assistance from various units involved in the DSS/ALOC system within Korea and from Sharpe Army Depot, Lathrop, CA.

THE SCOPE OF THE STUDY:

- (1) Although the DSS/ALOC system is worldwide in scope, the study was confined to the 4 segments of OST within Korea which were controllable locally.

THE STUDY OBJECTIVES: (1) In 1972 the Army initiated a plan to improve direct support of OCONUS units by both air and surface shipment of materiel. The purpose of the Army's new system, designated as DSS/ALOC, was to consolidate and containerize direct support materiel in CONUS and deliver it to Supply Support Activities (SSAs) and Distribution Drop Points (DDPs) with minimum handling of materiel between the CONUS air or surface port of embarkation (APOE/SPOE) and the SSA/DDP. The Army intended to containerize cargo to the maximum extent possible and eliminate intermediate depot level inventory. The system would therefore yield faster delivery of cargo to the requisitioner and reduce costs in the inventory pipeline.

- (2) The study's objectives were to:

- | | |
|------------|---|
| Primary: | <ul style="list-style-type: none">o Reduce order ship time (OST),o Improve the transportation element of the total system, |
| Secondary: | <ul style="list-style-type: none">o Maintain cargo visibility and control,o Improve coordination between supply and transportation,o Reduce demurrage costs at the Port of Pusan, ando Reduce loss or damage to cargo enroute. |

BASIC APPROACH:

The study team met with the various supply and transportation agencies and personnel to confirm study objectives and methodology. The approach included on site interviews and inspections of DSS/ALOC operations at the Consolidation and Containerization Point at Sharpe Army Depot, the Surface and Air Ports of

Embarkation at Oakland Army Terminal and Travis AFB, the Surface and Air Ports of Debarkation at Pusan and Osan AFB Korea, DDPs and SSAs, and transportation units within Korea. Measurements of OST by in-country segments comprised the data base. By using the inventory pipeline turnover time and daily costs for the air and surface portions, the team was able to estimate savings to accrue from reduced OST. Improvements of noted deficiencies in misdirected cargo, container dumrrage, loose and breakbulk cargo, improper identification of DSS shipments, tardy pickup of cargo by customers, DSS/ALOC cargo accountability and stop-off charges, processing of intransit data cards, and improvements at SSAs and DDPs resulted in significant gains in DSS/ALOC operational efficiency and effectiveness.

REASONS FOR PERFORMING STUDY: In 1972 HQDA initiated a Direct Support System for filling requisitions from the field by surface shipment. In 1976 DA added the Air Line of Communication function and began shipments through U.S. Air Force bases to overseas destinations. The Commanding General, 19th Support Command, recognized that since the inception of the DSS/ALOC system, there had been no systematic and comprehensive appraisal of the total Direct Support System. Consequently, the CG initiated a review of the DSS/ALOC system in Korea by requesting USFK ACS, Resource Management to investigate the system. His main objectives were to reduce OST, improve the transportation system, improve cargo visibility and control, reduce demurrage costs at the port, and find other ways to improve the overall DSS/ALOC system for Korea.

STUDY IMPACT: During several in process reviews the study team briefed findings to the 19th Support Command and other participating units. The commands responded to several findings before the study was complete, thereby reducing OST and correcting inefficiencies within the system. The expected cost savings coming from reductions in OST are considered as recovery of economic opportunity loss or cost avoidance figures totalling between \$5 and 6 million per year. Savings in improved delivery and reduced RODs will amount to \$58,000 per year. Demurrage costs at MTMC Terminal-Pusan should decrease by \$5,000 per year.

STUDY SPONSOR:

19th Support Command, APO SF 96212-0171

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS:

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ACS, Resource Management

Management Div, Systems Analysis Branch

APO SF CA 96301-0009

Principal authors: Dr. William L. Johnson and Ms. Pak, Chae-Suk

DTIC ACCESSION NUMBER: NA

COMMENTS AND QUESTIONS MAY BE SENT TO:

HQ USFK/EUSA ACSR

Management Division (PAK, Chae-Suk)

APO SF CA 96301-0009

AV 315-723-6500

START AND COMPLETION DATES OF STUDY:

Start: Sept 1, 1987

End: April 30, 1988



ENGINEER ASSESSMENT, SOUTHWEST ASIA (SWA)

STUDY

GIST

THE PRINCIPAL FINDINGS

- (1) Deploy the engineer force earlier in order to complete those engineer support tasks that are crucial to the survival of Third US Army (TUSA).
- (2) Add engineer units to the force structure.
- (3) Negotiate with other services for engineer support in those areas which are devoid of Army engineer assets.
- (4) Pursue political or military agreements with friendly nations of the region to supplement US engineer capability with their national assets.
- (5) Examine the impact of catastrophic war damage on critical components of the logistics delivery network.

THE MAIN ASSUMPTIONS

- (1) The deployment of US forces occurs in 1986 in accordance with the schedules and against the threat depicted in TUSA OPLAN.
- (2) No engineer support is available from local national assets.
- (3) Engineer work is estimated at austere standards of construction.
- (4) War damage suffered by Army facilities is determined using methods described in, *Soviet Air and Unconventional Warfare Damage, Southwest Asia* (Engineer Studies Center, 1987).
- (5) Limited Army engineer support is provided to sister services.

THE PRINCIPAL LIMITATIONS

- (1) XVIII Airborne Corps did not have a fully developed OPLAN.
- (2) Intelligence estimates for SWA were also not fully developed.

THE SCOPE OF THE STUDY

- (1) To assess TUSA engineer requirements across its entire range of combat, combat support, and combat service support activities.
- (2) To establish the TUSA's priority for engineer support requirements.
- (3) To quantify engineer requirements by time of occurrence and by operational echelon supported.
- (4) To assess the effect shortfalls will have on the Army's ability to deploy and sustain combat forces in Southwest Asia.

THE STUDY OBJECTIVES

- (1) To characterize the ability of TUSA engineers to successfully support the deployment of operational forces into Southwest Asia.
- (2) To identify specific engineer tasks which are absolutely crucial to the survival of land forces.
- (3) To provide the TUSA staff with extensive data for planning.
- (4) To recommend achievable solutions to the problems uncovered during the course of the study.

BASIC APPROACH Four SWA scenarios were used to depict the time-phased actions of TUSA under different combat situations. Engineer work generated by unit actions was examined for each subordinate division, the corps rear, and the echelon above corps areas. For the analysis of the corps and below, each engineer task was defined by the number of hours of squad labor and equipment time needed; for the echelons above corps, tasks were defined in terms of the number of hours of horizontal, vertical, and general construction labor needed. Capability was measured by construction skill and equipment type using OPLAN force deployment schedules. Shortfalls were identified by matching time-phased capability against requirements. Three special areas of interest were examined separately: combat bridging, water drilling, and port and logistics-over-the-shore operations.

REASONS FOR PERFORMING THE STUDY The study was done to provide the sponsor with a realistic assessment of the capability of his combat engineers to support a deployment of forces into SWA.

STUDY IMPACT

(1) TUSA was able to substantially increase its OPLAN engineer force structure during the 1992 Total Army Analysis.

(2) The concern for a dredging capability to support contingency operations in remote areas has been elevated to the Assistant Secretary level.

(3) The operational specifications of equipment designed for logistics-over-the-shore operations is being reexamined by all the services.

(4) Detailed operational plans have been developed throughout the subordinate commands using data and findings from the study.

(5) Forces were redistributed within the theater and engineer forces were rescheduled to arrive earlier.

(6) Engineer capabilities and limitations have had a significant impact on TUSA's development of a new OPLAN.

STUDY SPONSOR Commander, Third US Army, Fort McPherson, Georgia

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS The Engineer Studies Center did this study. The principal authors were Miss Susan Wright, Mr Terry Atkinson, MAJ Mike Rigsby, Mr James Thompson, Mr Rich Taylor, and MAJ Damian Kelly.

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Casey Building, #2594

Fort Belvoir, Virginia 22060-5583

POCs are: Miss Susan Wright (355-2285) and Mr Terry Atkinson (355-2287).

DATES OF THE STUDY Start: December, 1985; final SAG & Draft Report: December 1987; Published Study: August 1988.



1. Principal Findings

- a. The willingness to perform more formal training is directly dependent upon family and employer support.
- b. Increased full-time training requirements could more than double reenlistment losses -- to as much as a 47% attrition rate.
- c. Maximum availability of Reserve Components Configured courseware could reduce three-quarters of this attrition.
- d. The limitation of SOJT as a reclassification tool is not supported by the troops or commanders.
- e. Split Training Option use will be fundamentally altered by any AIT length increases.
- f. The Data Array provides a tool that assists balancing the training seat needs of the Army and ARNG with the assets available.
- g. The Training Options Guide provides an MOS progression road map for both individual soldiers and small unit leaders.

2. Main Assumptions

- a. Selection of a survey population may utilize unit type in lieu of individuals. Proper random selection of units will give a realistic balance of unit members. Control and administration at unit level would provide higher return rates and confidence levels.
- b. What soldiers say they will do is a valid indicator of what they will do.
- c. Data base training requirements were stable as of the study date; valid and complete.

3. Principal Limitations

- a. Polled 52 company-size units in ten states.
- b. Only polled soldiers present at a unit training assembly.
- c. Data array information was frozen at a given date. Does not include force structure changes or other updates.
- d. Training Options Guide does not include content of required unit-level training.

4. Scope of the Study

- a. Developed a training model (options guide) for every MOS.
- b. Listed and catalogued personnel and school data for every MOS at each skill level.
- c. Polled 3,000-plus soldiers, conducted 52 focus groups and surveyed 52 unit chains of command in ten states. Units were representative of force structure as it existed during the survey.

5. Study Objectives. This study --

- a. Surveyed troop attitudes on the impact of increased formal training requirements on retention rates;
- b. Arrayed all available data on current strength and training courses by MOS; and
- c. Developed a model to show training progression with alternatives.

6. Basic Approach.

The basic approach for this study followed two parallel paths. One collected quantifiable data on strength, MOS qualification, and school requirements, and from this, developed a "snap shot" data base.

In parallel, developed, tested and fielded a survey that sought soldier and chain of command input regarding the impact of proposed and recently implemented training requirements.

Included 100-plus question survey of random population, chain of command "mail survey," and focus group discussions with representative samples. From this, predicted behavioral impact of the training requirements. The findings of these merged to provide guidance for development of the Training Options Guide, oriented to the squad, section and platoon sergeant and the unit commander.

7. Reasons for Performing Study

The study was performed to provide the sponsor a realistic assessment of unit impact -- from soldiers and their immediate leaders -- of emerging training policies. It also produced a tool for small unit leaders to use in planning for and counseling on the myriad courses their soldiers must complete at each level of their careers by showing the choices available.

8. Study Impact

a. The study provided the sponsor a useful tool to incorporate into a forthcoming small unit leaders handbook.

b. It highlighted the difficulty in assembling the training requirements one soldier might be faced with, the competing pressures our soldiers face when deciding which courses to complete, in which mode and at what location, plus the stated impact on the strength -- and therefore, readiness -- of the ARNG.

9. Study Sponsor

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(Enlisted Branch, Army Personnel Division)
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10. Performing Organization and Principal Authors

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13. Start and completion dates of the study

30 Sep 87 - 27 May 88

MILITARY APPLICATIONS FOR
DOUBLE-STACKING RAILCARS

STUDY
GIST

THE PRINCIPAL FINDINGS

(1) Military cargo can be containerized or placed on some intermodal ANSI/ISO platform for transport by double-stacking railcars.

(2) An analysis of recent DOD containerized cargoes booked for shipment show that any combination of conventionally loaded 20- and 40-foot containers is within the cargo-carrying capacity of double-stacking railcars.

(3) Double-stacking of containers is not necessary for the railcar to be militarily useful.

(4) The double-stacking railcar can be used to haul over-height cargo on flatracks.

(5) Double-stacking railcars can be used to transport large quantities of military cargo.

(6) The low-slung design of the railcar positively affects military utility of the car.

(7) The current double-stacking railcar fleet could displace over 27,000 militarily useful flatcars.

THE MAIN ASSUMPTIONS

(1) If dimensional and weight constraints are met, cargo can be satisfactorily secured (blocked, braced, lashed) in a container.

(2) Maximum double-stacking railcar payload is 100,000 pounds.

(3) Maximum double-stacking railcar clearance is 18 feet.

(4) Overheight cargo can move on flatracks.

THE PRINCIPAL LIMITATIONS

(1) A large number of containers would be necessary in a mobilization. Desired sizes and quantities of containers may not be readily available in timeframe desired.

(2) The installation containerization support infrastructure may be unable to meet demands created by containerization and double-stacking railcars.

THE SCOPE OF THE STUDY

(1) Determines the military usefulness of double-stacking railcars.

(2) Estimates the economic and operational impact on the Defense Transportation System caused by increased use of double-stacking railcars in commercial industry.

(3) Summarizes inland terminal and port facility requirements for facilities handling double-stack railcars.

THE STUDY OBJECTIVES

(1) Assess and quantify levels of containerization possible by type division.

(2) Develops rank-ordering by type division of utility of using double-stacking railcars.

(3) Identify and recommend actions that would include use of double-stacking railcars in the Defense Transportation System.

BASIC APPROACH

The basic approach for this study was to determine the double-stacking railcar's military utility by developing a computer model which determined what Army equipment is containerizable and flatrack compatible. Several iterations, using the double-stack compatibility model, were then performed to assess container and flatrack compatibility of all seven types of Army divisions. Operational requirements and economic impacts in commercial industry were examined as a result of double-stack technology, and recommendations were made to prepare military installations to meet the demands created by containerization and double-stacking railcars.

REASONS FOR PERFORMING STUDY

The study was performed to provide the DOD transportation community with a realistic assessment of the military utility of the double-stacking railcars.

STUDY IMPACT

(1) The study will enable the DOD transportation community to prepare for increased use of double-stacking railcars.

(2) The study provides recommendations which need to be implemented to meet demands created by increased containerization.

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START AND COMPLETION DATES OF STUDY

January 1987 - June 1988

STUDY GIST
STRAHNET CONNECTOR ATLAS

THE PRINCIPAL FINDINGS

(1) The study identified 9,500 miles of connector routes - 1,735 of noninterstate STRAHNET highway and 7,765 miles of highway not related to STRAHNET.

(2) Where rail is available, military units will usually deploy oversize/overweight equipment by that mode.

(3) Routing oversize/overweight equipment via the Interstate system, rather than the Federal, State, and local highway systems, will almost always have fewer physical restrictions.

(4) Installation planned deployment routes are not always the least restrictive or fastest route.

(5) Two critical factors for successful deployment are vertical clearance and bridge capacity.

(6) Routes identified in this study will help ensure that US Military Forces can rapidly deploy via a reliable highway transportation system.

THE MAIN ASSUMPTIONS

(1) Height, width, and weight limitations exist along many designated deployment routes.

(2) Existing deployment routes for oversize/overweight equipment-transporter combinations were not necessarily the best routes.

(3) Routings via the National System of Interstate Defense Highways, rather than the Federal, State, and local highway systems, will have fewer restrictions.

THE PRINCIPAL LIMITATIONS

(1) DOD policy dictates that military movements on public highways will not exceed legal restrictions without prior permission from state, local, or toll authorities.

(2) State policies differ in height, width, and weight limitation for permitted loads.

(3) State engineers did not test actual transporter-equipment combinations to determine bridge loading analysis, but would have preferred to do so.

(4) The study included 223 DOD installations, less than half of the active sites, but over 80 percent of those deploying oversize-overweight equipment.

(5) Some states were reluctant to evaluate routes without compensation.

THE SCOPE OF THE STUDY

(1) The study would evaluate roads that connect the Interstate highway system with key defense installations and ports of embarkation.

(2) Connector routes would be the most capable of carrying oversize/overweight equipment.

(3) Major installations having deployment requirements would be included in study.

THE STUDY OBJECTIVES:

- (1) Identify the STRAHNET connector routes that link interstate highways with key defense installations and ports of embarkation.
- (2) Determine capability of the routes to support oversize/overweight traffic.
- (3) Publish an atlas specifying routes.
- (4) Identify route deficiencies for incorporation by civil highway authorities into their highway programs.
- (5) Provide information for the development of DOD highway policy input to Congress and State legislatures.

BASIC APPROACH

The study approach was to first contact the defense installation, usually the Installation Transportation Officer (ITO), to determine deployment routes and the largest and heaviest equipment-transportation combination to be deployed. The routes and axle loadings were then compiled and forwarded to respective state highway agency for evaluations. The states responded with either approval, denial with constraint criteria, or denial with suggested alternate routes. Alternate routes were coordinated with ITO. Documentation was then made on map plates and incorporated into the atlas.

REASONS FOR PERFORMING STUDY

- (1) Study was conducted because STRAHNET connector route evaluation had, heretofore, never been made.
- (2) The atlas would provide a handy reference for ITO's at key installations and reserve sites involved in deployment or even regular military movement of oversize/overweight equipment.
- (3) The study would identify deficiencies to civil authorities for incorporation into their highway improvement programs.
- (4) The atlas may become a tool to assist in the development of DOD highway policy.

STUDY IMPACT

- (1) Critical limitations identified on highway routes would be improved and funded through local, state, or federal highway programs.
- (2) Improved routes from DOD installations to ports of embarkations will ensure the most efficient mobilization, deployment, and sustainment of US Forces during a defense contingency.

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START AND COMPLETION DATES OF STUDY:

Volume I: Apr 82 - Mar 85.
Volume II: Apr 85 - Feb 86.
Volume III: Nov 86 - Jul 88.



SUSTAINMENT ENGINEERING

STUDY

GIST

THE PRINCIPAL FINDINGS

(1) Sustainment engineering (SE) tasks are crucial to the success of operations plans (OPLAN) in the three major theaters: Europe, Korea, and Southwest Asia.

(2) There are specific SE tasks that cannot be accomplished by the existing engineer force structure due to either a lack of forces and materials, inadequate or outdated equipment, or inefficient and ineffective techniques.

(3) The primary SE tasks requiring research and development solutions include logistics-over-the-shore operations (LOTS), airfield damage repair, port operations and repair, and construction of petroleum, oil, and lubricant (POL) pipelines and storage facilities.

(4) That other studies, with a different purpose, can be relied on and quickly repackaged, to answer very different questions. By using data developed to support other issues, the Engineer Studies Center (ESC) was able to provide a rapid response to an unexpected request.

THE MAIN ASSUMPTIONS

(1) The evaluation would be based on the results of the three ESC engineer assessments for Europe, Korea, and Southwest Asia.

(2) The SE mission areas and supporting tasks are as defined in Field Manual 5-104.

(3) The priority of the SE missions and tasks are correctly determined by the users of engineer support in each of the three theaters.

(4) SE tasks listed as vital and critical are crucial to the success of the OPLAN, and are to be performed by US Army engineer forces.

PRINCIPAL LIMITATION Because of the request for a quick-response study, an in-depth analysis of all the individual service SE needs and supporting research and development (R&D) programs was not conducted.

THE SCOPE OF THE STUDY

(1) Discusses the important link between SE tasks and the successful accomplishment of logistics support missions.

(2) Uses three previous analyses of theater-wide engineer requirements and capabilities, to identify high priority SE missions and tasks.

(3) Based on those analyses, identifies vital and critical SE tasks that cannot be accomplished by the existing engineer forces and why.

(4) Discusses solutions and identifies high-priority areas where R&D can play a key role.

THE STUDY OBJECTIVES The study had several objectives, principally to show that:

(1) SE is indeed a part of the larger Army logistics mission.

(2) SE is viewed as a high priority mission area by force planners in each of the principal theaters.

- (3) SE has inherent engineer equipment, material, force, and doctrinal problems.
- (4) SE problems are DoD wide problems, not just Army problems.

BASIC APPROACH

ESC first examined the definition of logistics as defined by the Joint Chiefs of Staff, and reviewed the role SE plays in the successful completion of these logistics missions. ESC then researched the nine major SE mission areas and their supporting tasks. When this was completed, three previous ESC theater-wide engineer assessments were reviewed and the prioritized SE missions and tasks extracted. The SE tasks rated as vital and critical to the success of the OPLANs became the focus of further evaluation. Each engineer assessment also provided insights as to the ability of existing engineer forces to accomplish these missions and tasks. In many cases, crucial tasks were not accomplished due to a lack of engineer equipment, materials, or effective techniques. Those high priority SE tasks that fell into this category were, therefore, recommended as primary candidates for R&D support.

THE REASONS FOR PERFORMING THE STUDY Engineering R&D support of SE missions comes under the review of the Logistics R&D General Officer Steering Committee (LOG R&D GOSC). In an era of budget constraints, the LOG R&D GOSC has been more cautious about committing resources to LOG R&D programs. Consequently, the Directorate of R&D, Office of the Chief of Engineers requested ESC present our views on the priority of SE tasks, and identify on which SE tasks the GOSC should focus their limited resources.

STUDY IMPACT

(1) Provided a framework within which to judge the priority of various SE tasks and which of those tasks, because of their importance to the success of the OPLAN, merit R&D resources.

(2) Elevated the importance of solving SE problems to the widely diverse agencies represented by the LOG R&D GOSC.

(3) Served as a prime example of how analysis agencies can fall back on previous studies and analyses for unexpected benefits.

STUDY SPONSOR Commander, USACE, Directorate of R&D, Washington, DC.

PERFORMING ORGANIZATION AND PRINCIPAL AUTHOR

The US Army Engineer Studies Center performed the study.
The author was Miss Susan J. Wright.

DTIC ACCESSION NUMBER B123086L

COMMENTS AND QUESTIONS MAY BE SENT TO

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DATE OF THE STUDY

Briefing to LOG R&D GOSC (basis of study): November-December 1987
Final report: March-June 1988

Transportability Engineering Analysis of the M1-Series Tanks

Weight Growth (60 to 80 Tons)

THE PRINCIPAL FINDINGS

(1) At M1 tank weights above 60 tons, the capacity of LARC-LX and LCM-8 landing craft, Army tactical bridging and the heavy equipment transport (HET) is exceeded.

(2) Above 121,250 pounds, the ability for contingency transport of two M1's per C-5 is lost.

(3) Above 130,000 pounds, the M1 exceeds the ramp capacity for the C-17 aircraft.

(4) Above 134,000 pounds, self-sustaining ships capable of transporting the M1 and available to DOD will be reduced 40 percent to 79 ships.

(5) Above 134,200 pounds, the M1 is no longer air transportable.

(6) Above 140,000 pounds, the tank exceeds the capacity of the new HET system.

(7) Above 148,000 pounds, the M1 exceeds the rated capacity of most European railcars, and the 140-ton flatcar can transport only one tank.

(8) Above 152,000 pounds, only 727 US flatcars can transport the M1.

THE MAIN ASSUMPTIONS

(1) Transport vehicles were reviewed at their rated payload capacity, with no overload consideration.

(2) The weight of the M1 will continue to increase as modifications are made and newer models are produced.

(3) The principle areas of interest for transport of the M1 are CONUS and NATO countries.

THE PRINCIPAL LIMITATIONS

(1) Any weight increase for the M1, increases the difficulty of transport.

(2) The assets for transporting the M1 are in place or procurement is under way, with payload capacities set.

THE SCOPE OF THE STUDY

(1) Transport of the M1 was considered in CONUS and NATO countries.

(2) Transport assets typically used to move the M1 were considered for the highway, rail, marine, and air modes.

THE STUDY OBJECTIVES

(1) To determine how the weight growth of the M1 will affect the transport assets available to move it.

(2) To establish weight thresholds at which significant transport assets losses occur.

THE BASIC APPROACH

To determine the M1 weights at which a major reduction in transport capability occurs, the weight growth was assessed in 1-ton increments. The study clearly shows the weight at which the capacity of each modal subsystem is exceeded.

REASONS FOR PERFORMING STUDY

This study was performed to show that the M1 becomes extremely difficult, and eventually impossible, to transport as it gains weight from 60 to 80 tons.

STUDY IMPACT

Based on this study, TRADUC and AMC jointly established the upper weight limit for the tank at 70 tons. It is to have a maximum weight of 64.5 tons after being "reduced" for shipment. Future systems should not exceed 65 tons.

STUDY SPONSOR

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DTIC ACCESSION NUMBER: Final Report TR 87-V4-22

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START AND COMPLETION DATES OF STUDY

May - July 1987



**ULTRA-FAST SEALIFT STUDY
(UFSS) (U)**

**STUDY
SUMMARY
CAA-SR-87-25**

THE REASON FOR PERFORMING THE STUDY is to support the Deputy Chief of Staff for Operations and Plans (DCSOPS) in assessing the impact on the strategic mobility system and theater combat operations of an unconventional ship design using the surface effects ship (SES) technology.

THE PRINCIPAL FINDINGS of UFSS are:

(1) The critical characteristics of the surface effects ship fast sealift (SFS) are identified and their impact on the ship's performance are determined.

(a) The catamaran design of the SFS makes the ship more seaworthy than conventional ships.

(b) The SFS's shallow draft allows for access to a greater number of ports than most conventional cargo ships.

(c) The increased speed and decreased draft reduce the ship's vulnerability to the threat weapons systems.

(2) With the air and sealift assets available for global deployment of Army forces in 1992, significant shortfalls were identified which would prevent the force from meeting established movement requirements.

(3) The employment of SFS would have a significant positive impact on the deployment of US forces and subsequent combat operations.

(4) The SFS and a conventionally designed SL7 are comparable programs that could be funded which would significantly enhance strategic mobility.

THE MAIN ASSUMPTIONS of the study are those of the Joint Strategic Planning Document Supporting Analysis (JSPDSA), Fiscal Year (FY) 90-97, illustrative planning scenario. One additional assumption concerned the SFS characteristics; the SFS was assumed to have a minimum average speed of 55 knots and a 5,000 short ton cargo capacity.

THE PRINCIPAL LIMITATIONS of the study are:

(1) The availability of cost data for the SFS and the SL7 was very limited.

(2) A 1992 timeframe was considered in the comparative analysis because of data availability, however, neither the SFS nor the alternatives considered could be ready for deployment until 1995.

THE SCOPE OF THE STUDY includes determining the effect of adding SFS to the available deployment assets of the FY 92 Program Force and conduct of a equal cost, unequal effectiveness analysis. The study considers a conventional war within the context of the Defense Guidance (DG) scenario in the 1992 timeframe.

THE STUDY OBJECTIVES were to:

(1) Examine the utility of high-speed, ocean-going transport in terms of its impact on the accomplishment of current and projected strategic, operational and tactical requirements.

(2) Identify cost tradeoffs between SFS and other significant transportation and increased readiness concepts.

THE BASIC APPROACH for this study was to research the SFS, analyze its effect on the deployment of forces using the Transportation Model (TRANSMO), conduct an analysis of combat operations using the force effectiveness relationships contained in the Force Design Model (FDM), compare alternatives to the SFS, and conduct a sensitivity analysis on various SFS characteristics. TRANSMO deployments conducted under two different scenarios with varying numbers of SFS added to the system were compared to the requirements and to a base case deployment with no additional lift assets. The arrival schedule of the forces deployed in TRANSMO were input into the FDM, and an assessment of combat operations for each of the deployments was made. Using the same methodology as discussed above, three alternatives were compared to the SFS program. In addition, a sensitivity analysis was conducted on several SFS factors that could conceivably be altered during the course of the procurement process. The factors considered were number of ships, speed, cargo capacity, and an attrition factor. The measure of effectiveness for the sensitivity analysis was the deviation from latest arrival date (LAD) for the North Atlantic Treaty Organization (NATO) combat units.

THE STUDY SPONSOR was the Deputy Chief of Staff for Operations and Plans (DCSOPS), DAMO-SSP, Headquarters, Department of the Army (HQDA).

THE STUDY EFFORT was directed by CPT Daniel M. Gerstein, Strategy and Plans Directorate.

COMMENTS AND QUESTIONS may be directed to the Director, US Army Concepts Analysis Agency, ATTN: CSCA-SP, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

DEPARTMENT OF THE ARMY
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ATSC-DCD

12 Sep 88

SUBJECT: Study Gist: Unit Ministry Team Religious Support to Casualties on the AirLand Battlefield, ACN 064346

THE PRINCIPAL FINDINGS

1. The extensive research of this study provided the first thorough assessment of Unit Ministry Team (UMT) capabilities/limitations in ministry to casualties on the AirLand battlefield.
2. Religious support is different from, though complementary to, medical assets by providing a decidedly spiritual ministry of healing to the soldier on the AirLand Battlefield who may be experiencing a crisis of faith, fear, grief, guilt or despair.
3. Ministry functions on the battlefield include: ministry of presence, ministry to the dying, crisis and stress ministry, sacramental ministry, ministry of sustaining, ministry of guiding, ministry of worship, and ministry of celebration.
4. The Forward Thrust doctrine for religious support prohibits prepositioning chaplains at the battalion aid station as in the past.
5. Former manpower criteria for hospital UMTs based on the number of beds in a hospital can no longer be used, but rather they must be related to patient conditions.
6. The capabilities to locate and move to casualty locations, the ability to function in contaminated environments and the ability to provide distinctive religious group ministrations are subjects recommended for further study and deficiency corrections.

THE MAIN ASSUMPTIONS

1. Basic AirLand Battle and health service support doctrine will not change, although how health service support is organized for combat may change in the near future.
2. Force structure in future conflicts will be extremely austere.
3. Total Army Analysis 93 (TAA 93) casualty projections are adequate for planning future requirements.
4. Providing religious support to casualties is an integral part of providing religious support to all soldiers, including noncasualties.
5. The spiritual health of soldiers is as important as their physical health or the condition of their equipment in sustaining combat operations.

THE PRINCIPAL LIMITATIONS

1. The opportunity for chaplain play and casualty play in FTXs or simulation is limited.
2. Real world experience for mass casualty and NBC ministry is limited.
3. This study is conducted in the context of the European scenario of the threat of AirLand Battle.

THE SCOPE OF THE STUDY

1. This study will consider chaplain support to casualties at echelons at Corps and below with a theater slice, to casualties from point of wounding through the medical system.
2. This study recommends doctrinal areas for the Chaplain Branch impacting upon care and ministry in support of casualties on the integrated

battlefield within the AirLand environment.

3. This study considers the terms chaplain and UMT (Unit Ministry Team) as synonymous and interchangeable.

THE STUDY OBJECTIVES

1. To assess the role and the function of chaplain support to the casualty.
2. To determine the scope of chaplain support requirements for the broad spectrum of casualty care from the point of wounding to hospitalization.
3. To identify and prioritize chaplain capabilities for casualty support.
4. To identify religious issues being asked by chaplains and commanders confronted with the AirLand environment, congruent with the reality of the integrated battlefield, as these issues impact upon casualty care.
5. To evaluate role and function of the chaplain assistant as a member of the Unit Ministry Team in the pastoral care of casualties, e.g. support to "Battle Stress" casualties.
6. To identify changes in doctrine, organization, operational concepts (O&O), and in training to overcome deficiencies.

BASIC APPROACH

1. The basic approach for this study was to assess and analyze religious support to casualties on the AirLand Battlefield in light of AirLand Battle doctrine, threat considerations and an extensive research process. This search included a thorough review of civilian and military literature which references religious support provided to casualties. Responses to questionnaires sent to division chaplains and chaplains assigned to hospitals provided by a Subject Matter Expert Panel. A Study Advisory group assisted in the methodology and processing of the task.

REASON FOR PERFORMING THE STUDY

Neither chaplain nor health service support doctrine clearly describes the UMT's role, function, tasks or capabilities in providing essential religious support to casualties. By clarifying these areas and recommending courses of action to correct deficiencies, a clear guide for positive corrective actions is provided.

STUDY IMPACT

1. The study defines the relationship of the UMT to the medical community in the care for casualties and calls for future health services doctrinal writings to reference religious support to casualties on the AirLand battlefield.
2. The study summarizes the role and functions of the UMT in the care of casualties.
3. The study establishes the need for a change in the basis for the Manpower Authorization Requirements Criteria relating them more to patient classifications.
4. The study documents the need for expanded training and field exercises for UMTs in providing religious support to soldiers in mass casualty situations.

STUDY SPONSOR

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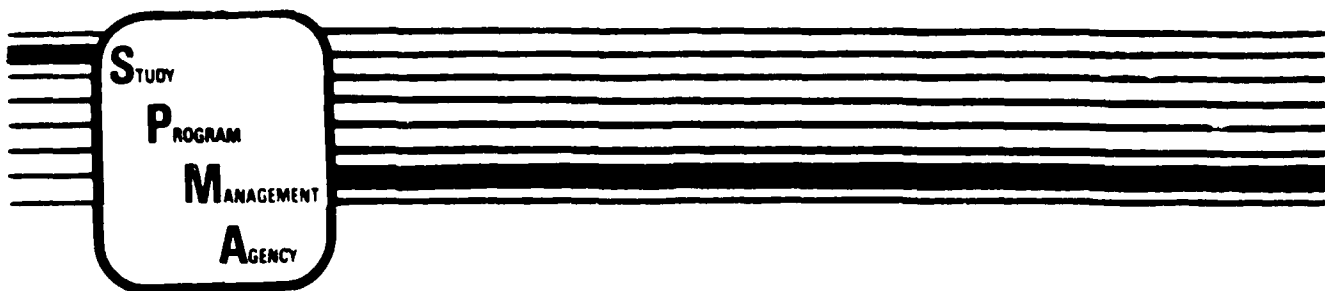
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START AND COMPLETION DATE

December 1984 - October 1987



LESSONS LEARNED FROM RECENT EXTERNAL PEER REVIEWS

LESSONS LEARNED FROM RECENT EXTERNAL PEER REVIEWS

Devin Bent, PhD, Consultant to SPMA

INTRODUCTION

Since 1982 the Deputy Under Secretary of the Army for Operations Research has sponsored external peer review of selected Army studies. Fourteen peer reviews have been completed through 1987. The lessons learned from the first five were compiled in 1984 and published in Army Highlights, Volume V, 1984. The lessons learned from the nine most recent peer reviews are presented below. Comments on the lessons learned are welcome and should be addressed to the Department of the Army, Study Program Management Agency, ATTN: SFUS-SPM, Washington, DC 20310.

CAVEAT

It is an unfortunate consequence of a lessons learned report that it seems to accentuate the negative. Thus it should be noted that several studies received very positive reviews, that every study made a contribution to the understanding of Army problems, and that all the studies shared certain strengths. For example, in no instance did the review panel doubt the objectivity of the study team. It must also be stressed that this compilation of lessons learned is derived from a small sample.

1. Literature Search: It is a characteristic of science that it is cumulative: it varies, builds on or even challenges what has come before. The cumulative nature of science requires that each study team familiarize itself with the previous body of work. It is therefore disturbing that the most frequently advanced criticism of the studies reviewed was either the absence of a literature search or a narrowly focused literature search that ignored relevant literature. This is not simply a pedantic criticism; in two cases the review team attributed other specific weaknesses in the study to the inadequate literature search. For example, an inadequate methodology was linked to unfamiliarity with the relevant methodological literature.

2. Presentation: An adequate presentation is also required if research is to be cumulative. While the study team may convey their findings to the sponsor through briefings and informal communication, the larger study community will become familiar with the study only through the written report. Inadequate presentation was one of the weaknesses stressed in the first lessons learned report (1984), and though mentioned less often, is also a characteristic of this set of reviews. However, there may be a hidden problem with presentation, since one of the two peer review teams that interviewed the study director found that significant matters were played down or omitted from the report. The peer review panel recommended that study teams be provided "more time and training to write clear, concise, and complete reports so that the full value of analytic efforts can be provided to the Army and not limited

to those who participated in the effort."

3. Cost Analysis: In the previous lessons learned report it was found that "Studies that involved cost analysis were judged to be shallow in this respect, although in both cases cost was a key factor." The finding of this report is similar. There were only two of the recent studies in which cost analysis was judged to be important by the peer review team and in both cases no cost analysis was presented.

4. Address Objectives: It would seem to be a basic requirement that the study address the defined objectives. However, in several cases the study either fails to address the objectives or addresses a related, but significantly limited set of objectives. In one instance, the review panel noted "significant omissions" in the study and questioned the "effective freedom of analysts to get into all facets of the problem." Because of the omissions, the objectives could not be adequately addressed.

5. Sensitivity Analysis: The previous lessons learned report found "serious problems of validity of results because of small samples, lack of sensitivity analysis and failure to estimate confidence intervals." The findings of this report are similar. Small sample size is mentioned in only two of the peer reviews; however, six of the nine peer reviews either note the total absence of sensitivity analysis or suggest that sensitivity analysis would be appropriate.

6. Measures of Effectiveness: Measures of effectiveness were also discussed in the previous lessons learned report. The problem is not as prevalent in this second set of reviews, but two studies do have significant weaknesses in this respect. In one case, no measures of effectiveness are developed and in the other, criteria are listed, but "not applied to compare alternatives or otherwise derive results." By way of contrast, another peer review team specifically commends the measures of effectiveness which are "defined in constructible, arithmetic terms."

7. Integration of Substudies: The previous report noted an "incomplete integration of substudies into a coherent analysis" in three of five studies. No mention is made of this problem in the nine peer reviews examined for this report.

CLOSING

It seems appropriate to publish the lessons learned from external peer reviews in the Army Study Highlights. Peer reviews and Army Study Highlights share the objective of improving the quality of Army studies. While the lessons learned from peer reviews do seem to emphasize the negative, the studies highlighted in this publication exemplify the best in Army studies.